



“Advance Testing and Measurement Techniques on Wireless Systems and Products with a focus on IoT device testing techniques”

Kailash Narayanan
Keysight Technologies, Inc.



Presentation summary:

1. Test challenges for IoT products
2. Test solutions for IoT products
3. Future outlook: internet of secured things and 5G connected cars

1. Test challenges for IoT products

1.1 Business challenges

As technologies evolve in a rapid pace, time to market can be a huge challenge for IoT device manufacturers to track all changes in testing standards and regulations, and to create something valuable before the next revolution takes place in the market.

The control of product and ownership cost is another challenging consideration as in the era of IoT, manufacturers do not manage an individual device but the whole connected network which involves multiple testing, connectivity, security, etc. Inadequate cost control will crucially influence testing operation and development.

Finally, business and management model marks another important challenge since it affects the scale, cloud analytics, commercial insights of a corporate, hence its development of IoT innovation.

1.2. Technical challenges

IoT is a world of constant updates and upgrade, which drains product battery and makes power consumption one of the biggest technical challenges facing manufacturers.

Another technical challenge is radio frequency (RF) design. On one hand, poor RF design consumes battery to locate signals; on the other hand, IoT devices are often put in the outdoors, underground, or other under-protected public areas, thus it is important for manufacturers to create RF design that can stand such varied locations.

Although the IoT device can be out of reach, it is still connected to user's home or private network, making network security and stability another important technical consideration.

Acceptance and authentication makes another essential technical challenge as manufacturers are required to pass certification tests before deploying an IoT device.

2. Test solutions for IoT products

2.1. Power consumption test and battery drain analysis

To consume power effectively, it is important to make accurate measurement across different modes of an IoT device, namely peak/ active stage and sleep/ idle stage.

For that, Keysight Technologies, Inc. (Keysight) introduces power consumption test and battery drain analysis to help create design that extends battery life and improve device productivity by analysing differences in current battery drain due to variations made in data transmission, identifying anomalous behaviours and measuring their effects on power consumption, etc. The solution is run with basic test and high performance in low cost per channel.

2.2. Multi-format wireless protocol tests

The proliferation of IoT devices reflects that multiple formats, such as WiFi, Bluetooth, ZigBee, etc. operate at the same spectrum, calling for a comprehensive tester that can cater all moderations.

To meet such market needs, Keysight institutes IoT technology solution, including high performance design & verification test, and high volume manufacturing test as well as application specific solution including small scale R&D low cost manufacturing test.

2.3. Oscilloscope and probes

As devices get smaller in size, it is more susceptible to noise and interference. To maintain signal and power integrity, Keysight's S-series oscilloscope and probes measure noise and ripple with greater details and make noise and transient evaluation easier. Its E5071C ENA series network analyser also improves accuracy, yield and margins with wide dynamic range and fast measurement.

3. Future outlook: internet of secured things and 5G connected cars

Mr Narayanan suggested that in the IoT ecosystem, the internet of secure things and 5G connected cars will become the leading applications, urging manufacturers to further develop testing techniques to stimulate security testing for connected cars within the automotive network.

The end

To learn more, please watch the presentation video at [here](#).